

CLAIMS

1. An OFDM-CDMA transmitting apparatus comprising:
a spreading section that spreads transmit symbols;
5 a number of multiplexing selection section that selects a number of multiplexing for each transmit symbol;
a multiplexing section that multiplexes a spread signal of each transmit symbol using a selected number of multiplexing; and
10 an orthogonal frequency division multiplexing section that distributes a multiplexed spread signal among a plurality of subcarriers.
2. The OFDM-CDMA transmitting apparatus according to
15 claim 1, wherein said number of multiplexing selection section makes a number of multiplexing of a specific symbol smaller than a number of multiplexing of other transmit symbols.
- 20 3. The OFDM-CDMA transmitting apparatus according to claim 2, wherein data for which better channel quality is required than for other data is allocated to said specific transmit symbol whose number of multiplexing has been reduced.
- 25 4. The OFDM-CDMA transmitting apparatus according to claim 2, wherein said specific symbol whose number of multiplexing has been reduced is placed at a start of

a frame.

5. The OFDM-CDMA transmitting apparatus according to claim 2, wherein said number of multiplexing selection
5 section reduces a number of multiplexing of a retransmission symbol in accordance as a number of retransmissions increases.

6. The OFDM-CDMA transmitting apparatus according to
10 claim 2, wherein a modulation M-ary number of said specific symbol whose number of multiplexing has been reduced is made smaller than a modulation M-ary number of other transmit symbols.

15 7. The OFDM-CDMA transmitting apparatus according to claim 2, wherein said specific symbol whose number of multiplexing has been reduced is inserted periodically.

8. An OFDM-CDMA receiving apparatus that receives and
20 demodulates a signal transmitted from the OFDM-CDMA transmitting apparatus according to claim 7, and performs propagation path estimation result updating using said periodically inserted specific symbol whose number of multiplexing has been reduced.

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9. The OFDM-CDMA transmitting apparatus according to claim 2, wherein a number of multiplexing of said specific symbol whose number of multiplexing has been reduced is

made "1".

10. The OFDM-CDMA transmitting apparatus according to claim 2, wherein said orthogonal frequency division
5 multiplexing section distributes chips of said specific symbol whose number of multiplexing has been reduced only in a time axis direction.

11. The OFDM-CDMA transmitting apparatus according to
10 claim 1, wherein said spreading section selects a spreading ratio for each transmit symbol and spreads a transmit symbol.

12. The OFDM-CDMA transmitting apparatus according to
15 claim 11, wherein said spreading section makes a spreading ratio of a specific symbol larger than a spreading ratio of other transmit symbols.

13. The OFDM-CDMA transmitting apparatus according to
20 claim 12, wherein data for which better channel quality is required than for other data is allocated to said specific transmit symbol whose spreading ratio has been increased.

25 14. The OFDM-CDMA transmitting apparatus according to claim 12, wherein said specific symbol whose spreading ratio has been increased is placed at a start of a frame.

15. The OFDM-CDMA transmitting apparatus according to claim 12, wherein said spreading section increases a spreading ratio of a retransmission symbol in accordance as a number of retransmissions increases.

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16. The OFDM-CDMA transmitting apparatus according to claim 12, wherein a modulation M-ary number of said specific symbol whose spreading ratio has been increased is made smaller than a modulation M-ary number of other
10 transmit symbols.

17. The OFDM-CDMA transmitting apparatus according to claim 12, wherein said specific symbol whose spreading ratio has been increased is inserted periodically.

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18. An OFDM-CDMA receiving apparatus that receives and demodulates a signal transmitted from the OFDM-CDMA transmitting apparatus according to claim 17, and performs propagation path estimation result updating
20 using said periodically inserted specific symbol whose spreading ratio has been increased.

19. The OFDM-CDMA transmitting apparatus according to claim 12, wherein said spreading section makes a spreading
25 ratio of said specific symbol whose number of multiplexing has been reduced "1".

20. The OFDM-CDMA transmitting apparatus according to

claim 12, wherein said orthogonal frequency division multiplexing section distributes chips of said specific symbol whose spreading ratio has been increased only in a time axis direction.

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21. An OFDM-CDMA transmitting method comprising a step of making a number of code division multiplexing of a specific transmit symbol smaller than a number of code division multiplexing of other transmit symbols.

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22. The OFDM-CDMA transmitting method according to claim 21, further comprising a step of making a spreading ratio of a specific transmit symbol larger than a spreading ratio of other transmit symbols.

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23. The OFDM-CDMA transmitting apparatus according to claim 1, wherein said spreading section increases a number of spreading codes assigned to a retransmission signal as a number of retransmissions increases and performs multicode multiplexing of a retransmission signal.

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24. The OFDM-CDMA transmitting apparatus according to claim 23, wherein said spreading section varies a number of spreading codes assigned to said retransmission signal in accordance with a number of other code division multiplexed signals multiplexed in said retransmission signal after multicode multiplexing.

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25. The OFDM-CDMA transmitting apparatus according to claim 23, further comprising a transmission power control section that increases transmission power of said multicode-multiplexed said retransmission signal as a number of retransmissions increases.

26. The OFDM-CDMA transmitting apparatus according to claim 25, wherein said transmission power control section varies said transmission power in accordance with a number of other code division multiplexed signals multiplexed in said retransmission signal after multicode multiplexing.

27. The OFDM-CDMA transmitting apparatus according to claim 21, wherein when said specific transmit symbol is a retransmission signal, that retransmission signal is spread by means of a number of spreading codes in accordance with a number of retransmissions.